

THE CADDISFLY GENUS ANAGAPETUS

(Trichoptera: Rhyacophilidae)

HERBERT H. ROSS

Illinois Natural History Survey, Urbana, Illinois

At the time of its original description, *Anagapetus* Ross was considered a subgenus of *Agapetus* chiefly because it lacked any of the specialized male secondary sexual characters which typify most groups of *Glossosoma*, its only other relative. More recently I have been fortunate in obtaining larvae and pupae of *Anagapetus*, and these stages, together with a more detailed study of the adults, have shed considerable light on the phylogeny of the entire complex.

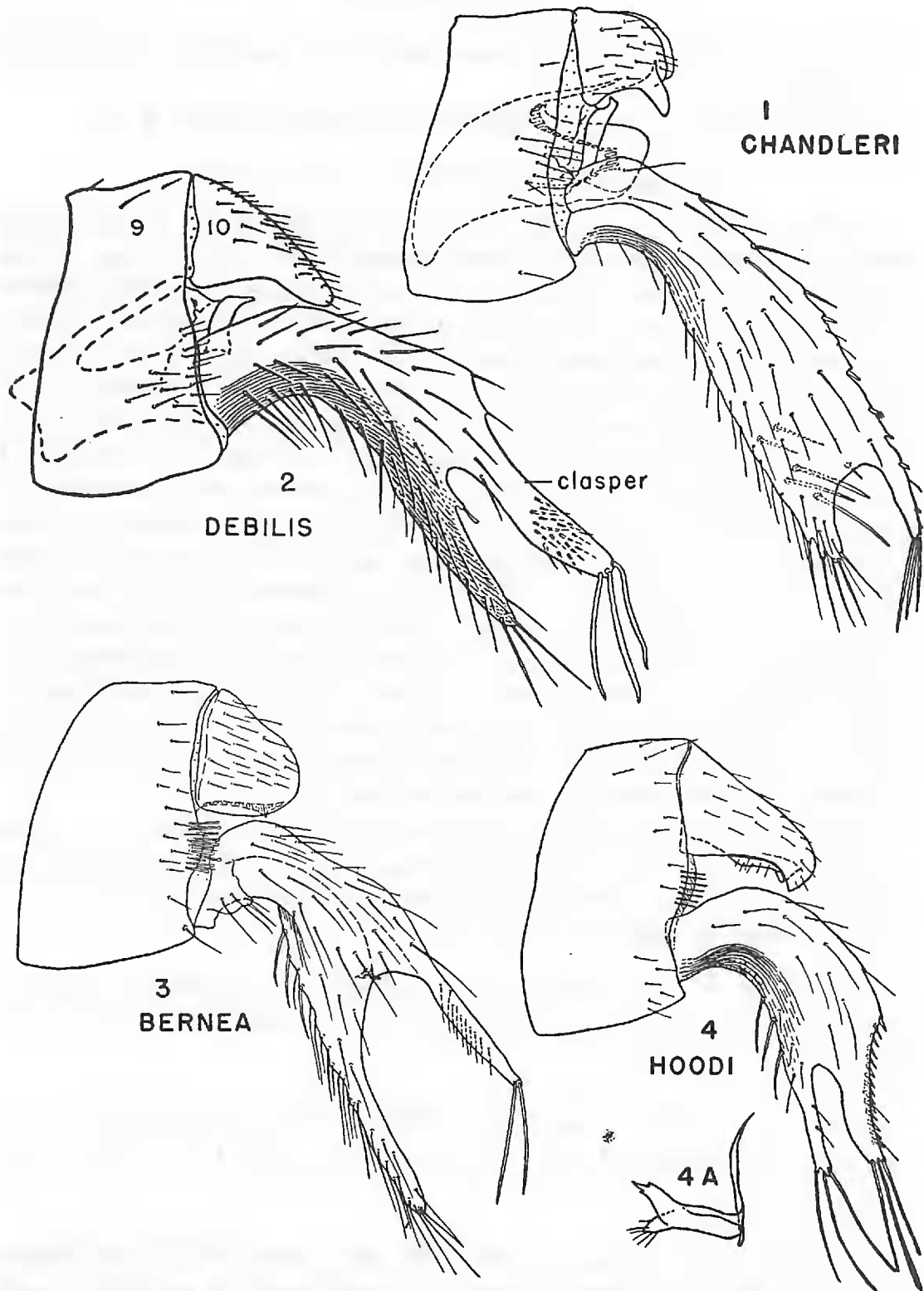
The larva of *Anagapetus* is virtually indistinguishable from that of *Agapetus*, the front leg being attached near the midpoint of the lateral margin of the pronotum. The pupa is more or less intermediate between *Agapetus* and *Glossosoma*, the mandibles having one of the preapical teeth a little more prominent than the other, in this way suggestive of *Glossosoma*. The adult lacks completely the specialized conditions which mark both *Agapetus* and *Glossosoma*; the hind wing has a full complement of veins, as in *Glossosoma*, and in this respect differs from the reduced venation typical of *Agapetus*; the front wing lacks the callosity and realignment of veins typical of *Glossosoma*; the legs have simple tibial spurs and the abdomen of the male has the lateral plate on the fifth segment only slightly developed in contrast with the highly specialized condition found in *Agapetus*. The adult of *Anagapetus* has only a single transverse wart on the mesoscutellum; both *Agapetus* and *Glossosoma* have a pair of small warts on this sclerite.

From this it would seem that *Anagapetus* is the most generalized group of the complex and represents the known existing form closest to the common ancestor of both *Agapetus* and *Glossosoma*. *Glossosoma* apparently diverged in one direction, developing distinctive characteristics especially in the larva and in the male, and *Agapetus* diverged in another direction, developing distinctive wing characters in the adult with little change in the larva or pupa.

It would seem from this that *Anagapetus* is an archaic remnant of an old phyletic stem. It is represented by only four known species distributed locally through the western montane region of North

America, from California to southern British Columbia. These four species are very closely related which would indicate that only one small branch of the genus has yet been unearthed, and that other branches are either extinct, rare, or occur in regions of the world which have not yet been well collected.

It is interesting that *Glossosoma* has developed into the dominant



Figs. 1-4. Male genitalia of *Anagapetus*, lateral aspect; fig. 4A, posterior aspect of mesal process at base of clasper.

saddle-case maker of the cold and rapid streams, especially abundant in mountainous areas. *Agapetus*, on the other hand, has moved towards warmer streams and is found most abundantly in the brooks of rolling and less mountainous terrains. In contrast, *Anagapetus* is relatively uncommon, and is known only from the slower small streams and brooks in the western mountains.

ANAGAPETUS ROSS

Agapetus subg. *Anagapetus* Ross, 1938, Ill. Nat. Hist. Surv. Bull. 21:109.

Genotype by original designation: *Agapetus debilis* Ross.

Anagapetus chandleri Ross, new species

Male—Length from front of head to end of wings, 5 mm. Color very dark brown, the legs below coxae lighter brown, the wings uniformly smoky brown. General structure typical for genus. Abdomen with a triangular projection on each side of fifth sternite, the two joined by a transverse ridge. Sixth sternite with a small mesal projection, seventh sternite with a slightly larger truncate mesal projection. Genitalia as in fig. 1. Ninth segment annular, with only scattered hairs on the side. Tenth tergite divided into a pair of lateral sclerotized lobes each with a membranous mesal area and with a toothlike ventrolateral projection. Clasper elongate, curved at base, incised for about a fifth of its length at apex to form a narrow dorsal and a wide ventral process; dorsal edge of clasper with a few short stout spines, remainder of clasper with long slender hair except for a few longer, stouter setae at tips of apical processes and along inner margin near apex; mesal area at base of clasper produced into a narrow vertical sclerite with a slight hook at its apex. Between these is exerted the small, elliptical, simple aedeagus which bears internally a sclerotized thickening as shown in fig. 1.

Female—Size, color, and general structure similar to male. Abdomen with paired lateral swellings on the fifth sternite as in male, sixth sternite with a large truncate apicomeresal process, seventh and eighth segments simple.

Holotype, male.—Two miles southeast of MARIPOSA GROVE, MARIPOSA COUNTY, CALIFORNIA, elevation 7,000 feet, August 27, 1946, H. P. Chandler.

Allotype, female.—Same data. Both holotype and allotype deposited on permanent loan in the collection of the California Academy of Sciences.

This species is readily identified by the short cleft of the clasper, the finger-like ventral processes of the tenth tergite, and the row of widely separated short spines on the dorsal margin of the clasper.

Anagapetus hoodi Ross, new species

Male—Length from front of head to tip of folded wings, 6 mm. Color very dark brown, in life appearing black, with the legs below coxae yellowish-brown. General structure typical for genus. Fifth, sixth, and seventh segments with structures and processes as described for *chandleri*. Genitalia as in fig. 4. Ninth segment annular, its posterior margin with a lateral comb of clavate setae between bases of clasper and tenth tergite. Lobes of tenth tergite a little longer than dorsal length of ninth segment, concave beneath so that each lobe has a mesal and lateral ventral angulation at tip. Clasper sharply curved just beyond base, and beyond this point enlarged into a wide, mesally concave structure incised at apex approximately one-third its total length; the dorsal process so formed is wide, bears usually three long setae at apex, and has a dorsal row of about 15 short, sharp spines which arise on the mesal side and project above the dorsal edge of the profile; ventral arm slender, bearing 3 or 4 long setae at tip. At base of clasper is a narrow mesal process which projects dorsad; this is not angled at tip as in *chandleri* but bears two or three short spurs, fig. 4A. Aedeagus short, ovoid, very similar to that of *chandleri*.

Female—Length 7 mm., color and general structure as for male. Abdominal segments simple and tubular, and indistinguishable externally from other species in the genus.

Holotype, male.—NORTH FORK of IRON CREEK, MT. HOOD, OREGON, July 30, 1948, Kenneth M. Fender.

Allotype, female, and one paratype, male.—Same data. All deposited in the collection of the Illinois Natural History Survey.

ANAGAPETUS BERNEA Ross

Anagapetus bernea Ross, 1947. Trans. Am. Ent. Soc. 73:131. ♂, ♀.

To date this species is known only from Hood River County, Oregon, and Berne, Washington, both localities in the heart of the Cascade Mountains.

ANAGAPETUS DEBILIS Ross

Agapetus debilis Ross, 1938. Bull. Ill. Nat. Hist. Surv. 21:108. ♂.
Anagapetus debilis Ross, Denning, 1949. Can. Ent. 80:113. ♀.

Originally described from Logan Canyon, Utah, additional records of this species extend its range through many areas of the Rocky Mountain ranges from Colorado to eastern Oregon, as follows: COLORADO—Green Mt. Falls: July 12, 1938, larvae; June 14, 1938, pupae, larvae; June 23, 1938, larvae; June 4, 1938, stream No. 1, pupae. West Creek: July 5, 1938, larvae, pupae.

Rocky Mountain National Park: Chiquita Creek, July 27, 1938, 3 ♀. UTAH—Beaver, June 26, 1942; Logan Canyon, Spring Hollow: July 17, 1938, ♂, ♀; July 21, 1938, ♂; Timpooneke Guard Station, Wasaben National Forest: Aug. 26, 1943, ♂, ♀; Maple Canyon, June 1, 1939, ♂. WYOMING—Fox Park: July 4, 1938, ♂, ♀; Wilson: Aug. 12, 1940, Coal Creek, ♂, ♀; Yellowstone National Park: Dunraven Pass, Mt. Washburn, Aug. 2, 1940, ♂; Specimen Creek, Station 5, Aug. 6, 1947, 6 ♂ ♀. OREGON—Durkee: Powell Creek, June 13, 1947, 5 ♂ ♀. MONTANA—Glacier National Park, Sprague Creek, July 11, 1940, ♂ ♂, ♀ ♀.

In each place in which I have collected this species it has occurred in a brook-type of stream rather than a more rapid cascading mountain creek. In no case have I taken them in the same stream with *Glossosoma*; the mountain species of this latter genus occur in the larger and more rapid streams.

KEY TO SPECIES—MALES

1. Apex of clasper only shallowly incised, lower margin not forming a slender finger; each lobe of tenth tergite with a thumblike lateral projection; fig. 1 *chandleri*
 Apex of clasper with a deep incision forming an upper and a lower finger-like process; tenth tergite at most with angulate corners, never with thumblike projections; figs. 2-4 2
2. Lateral lobes of tenth tergite short and deep, fig. 3; baso-mesal process of clasper extending backward so that it is almost indistinguishable from lateral view *bernea*
 Lateral lobes of tenth tergite longer than deep; baso-mesal process of clasper extending almost directly dorsad and easily seen from lateral view, figs. 2, 4 3
3. Dorsal arm at apex of clasper with a mesal cluster of fairly long setae, fig. 2 *debilis*
 Dorsal arm at apex of clasper with a mesal row of short spines along dorsal edge, and projecting above it, fig. 4 *hoodi*